



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,800	12/05/2001	Tomio Sugiyama	2635-40	2313

7590

07/07/2003

NIXON & VANDERHYE P.C.  
8th Floor  
1100 North Glebe Rd.  
Arlington, VA 22201-4714

EXAMINER

OLSEN, KAJ K

ART UNIT

PAPER NUMBER

1753

DATE MAILED: 07/07/2003

3

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/001,800

Applicant(s)

SUGIYAMA ET AL.

Examiner

Kaj Olsen

Art Unit

.1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. The claim is indefinite because it is unclear if the subject matter in the parenthesis is part of the claimed invention. This is especially true with the second parenthetical occurrence.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Fujii et al (USP 5,766,434) as evidenced by the applicant's disclosure.
5. Fujii discloses a gas sensing element that comprises a solid electrolyte 12 with a measured gas side electrode 131 exposed to the gas being measured as well as a reference gas side electrode 132 provided on another surface of the solid electrolyte substrate (fig. 1). Fujii also discloses a porous protective layer 11 covering the measuring gas side electrode (fig. 1). Although Fujii does not explicitly recite whether the layer has the set forth limit current density, Fujii does teach the use of a thickness for the protective layer 11 of 100 to 300 microns (col. 7, lines 16-19) as well as an average pore size diameter of 0.01 to 0.3 microns (paragraph bridging

Art Unit: 1753

col. 9 and 10). This combination of pore diameters and thickness overlaps the layer thickness range and pore diameter range that provided the gas permeation rates the applicant has stated provides the claimed limit current density of the claim (fig. 8 in conjunction with p. 14, lines 17-25). Hence, the protective layer of Fujii would appear to inherently possess the claimed limit current density.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Nakano et al (USP 5,419,828) as evidenced by the applicant's disclosure.

7. Nakano discloses a gas sensing element that comprises a solid electrolyte 11 with a measured gas side electrode 13 exposed to the gas being measured as well as a reference gas side electrode 12 provided on another surface of the solid electrolyte substrate (fig. 2). Nakano also discloses a porous protective layer 21 covering the measuring gas side electrode (fig. 1 and 2). Although Nakano does not explicitly recite whether the layer has the set forth limit current density, Nakano does teach the use of a thickness for the protective layer 21 of 5 to 300 microns with average pore size diameters of up to 2000 Angstroms (col. 7, lines 8-22). This combination of pore diameters and thickness overlaps the layer thickness range and pore diameter range that provided the gas permeation rates the applicant has stated provides the claimed limit current density of the claim (fig. 8 in conjunction with p. 14, lines 17-25). Hence, the protective layer of Nakano would appear to inherently possess the claimed current limit density.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1753

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al (USP 5,302,276) in view of Suzuki et al (USP 4,718,999).

10. Kato discloses a gas sensing element comprising a solid electrolyte substrate 3 having oxygen ion conductivity, a measured gas side electrode (1 or 11) provided on a surface of said solid electrolyte substrate so as to be exposed to a measured gas (fig. 1), a reference gas side electrode (2 or 12) provided on another surface of said solid electrolyte substrate so as to be exposed to a reference gas (fig. 1). Kato also discloses a porous electrode protecting layer (5 or 15) covering said measured gas side electrode, and reports that the desired gas permeability of this protective layer overlaps the claimed limit current density when the permeability is multiplied by the factor 0.1 (i.e. for an oxygen percentage of 0.1 %) (col. 2, lines 14-17).

Although Kato does not explicitly define this gas permeability as also being a limit current density, it would appear to the examiner that Kato is referring to a quantity that reads on the applicant's term in view of Kato, col. 4, lines 21-37. Although Kato has defined its limit current density in terms of area of the actual protective layer and not in terms of the area of the reference electrode as set forth by the claim, Kato's set forth permeability still reads on the claimed limit current density in terms of the reference electrode area because the protective layer (5 or 15) area is clearly greater than 2.5% of the total area of the reference electrode (only at less than 2.5% would the 1.6 mA of Kato (see above) read away from the claimed lower limit of 0.04 mA).

With respect to the conditions the sensor is operating under for the claimed limit current density, Kato teaches both the oxygen concentration as well as the temperature (col. 4, lines 21-35).

Art Unit: 1753

Although Kato does not explicitly teach the use of 0.5 V, Suzuki teaches that for limit current measurements, at least 0.5 V must be applied in order to get to the limit (i.e. saturation) current region of the sensor and specifically teaches the use of voltages between 0.5 and 1 V (fig. 4 and paragraph bridging col. 5 and 6). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Suzuki for the gas sensing element of Kato in order to ensure a sufficient voltage is applied to get to the limit current region of the sensor operation.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506. The examiner can normally be reached on Monday through Thursday from 7:00 AM-4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Nam Nguyen, can be reached at (703) 308-3322.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for regular communications is (703) 305-3599 and the fax number for after-final communications is (703) 305-5408.

Art Unit: 1753

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a long horizontal flourish extending to the right.

Kaj K. Olsen  
Patent Examiner  
AU 1753  
June 30, 2003